

CLAIMS

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is as follows:

- 1 1. A voltage regulator for an electrical device
2 having a plurality of operating modes having
3 differing current consumption, said voltage
4 regulator comprising
5 a regulator stage having an input for receiving
6 an input voltage, and
7 a V_{bus} supply regulator stage having an input
8 for receiving information corresponding to an
9 operational mode of said electrical device and
10 supplying a voltage corresponding to said
11 operational mode or said current consumption as said
12 input voltage to said regulator stage.
- 1 2. A voltage regulator as recited in claim 1,
2 wherein said electrical device exhibits a working
3 mode and a sleep mode.
- 1 3. A voltage regulator as recited in claim 2,
2 wherein said electrical device is a CPU.
- 1 4. A voltage regulator as recited in claim 1,
2 wherein said V_{bus} supply regulator stage provides one
3 of two discrete voltages.

1 5. A voltage regulator as recited in claim 1,
2 further comprising
3 a ramp generator for generating a ramp waveform
4 having an amplitude corresponding to said selected
5 voltage for control of said regulator stage.

1 6. A voltage regulator as recited in claim 1,
2 further including
3 a feedback loop in said V_{bus} supply regulator
4 stage.

1 7. A voltage regulator as recited in claim 6,
2 wherein said feedback loop includes an R_{tilt} resistor.

1 8. A voltage regulator as recited in claim 6,
2 further including
3 a feedback loop in said regulator stage
4 including signal paths for signals corresponding to
5 output voltage and output current of said voltage
6 regulator, respectively.

1 9. A voltage regulator as recited in claim 8,
2 wherein said signal path for said signal
3 corresponding to output voltage includes an R_{droop}
4 resistor.

1 10. A voltage regulator as recited in claim 8,
2 further including
3 a connection for supplying said signal
4 corresponding to said output current to said
5 feedback loop of said V_{bus} supply regulator stage for
6 making an adjustment to a said voltage.

1 11. A voltage regulator as recited in claim 10,
2 wherein said adjustment to said voltage provides a
3 continuous range of voltages.

1 12. A voltage regulator as recited in claim 11,
2 wherein said regulator stage comprises a plurality
3 of parallel voltage regulator circuits

1 13. A voltage regulator as recited in claim 12
2 wherein operation of selected ones of said parallel
3 voltage regulator circuits may be discontinued in
4 response to current load requirements.

1 14. An electrical device comprising
2 a load having a plurality of operating modes
3 having differing current consumption, and
4 a voltage regulator, said voltage regulator
5 including
6 a regulator stage having an input for
7 receiving an input voltage, and
8 a V_{bus} supply regulator stage having
9 an input for receiving information
10 corresponding to an operational mode or
11 current consumption of said electrical
12 device and supplying a voltage
13 corresponding to said operational mode or
14 current consumption as said input voltage
15 to said voltage regulator stage.

1 15. An electrical device as recited in claim 14,
2 further including
3 a feedback loop in said V_{bus} supply regulator
4 stage.

1 16. An electrical device as recited in claim 15,
2 wherein said feedback loop includes an R_{tilt} resistor.

1 17. An electrical device as recited in claim 15,
2 further including
3 a feedback loop in said regulator stage
4 including signal paths for signals corresponding to
5 output voltage and output current of said voltage
6 regulator, respectively.

1 18. An electrical device as recited in claim 17,
2 wherein said signal path for said signal
3 corresponding to output voltage includes an R_{droop}
4 resistor.

1 19. An electrical device as recited in claim 17,
2 further including
3 a connection for supplying said signal
4 corresponding to said output current to said
5 feedback loop of said V_{bus} supply regulator stage for
6 making an adjustment to a said voltage.

1 20. An electrical device as recited in claim 19,
2 wherein said adjustment to said voltage provides a
3 continuous range of voltages.